

Co-Matrix™ Filters for Electrolyte Filtration

**SpinTek Filtration, Inc.
Delkor South America Ltd.**



Organic Recovery



SpinTek Installations

• CVRD USINA, Brazil	129 m ³ /hr
• Chelopech, Bulgaria	225 m ³ /hr
• Gaby, Chile	1,400 m ³ /hr
• Kansanshi Copper, Zambia	494 m ³ /hr
• BHP-Billiton (Escondida), Chile	1,700 m ³ /hr
• Spence, Chile	2,400 m ³ /hr
• Goro Nickel, New Caledonia	1,750 m ³ /hr



SpinTek Installations

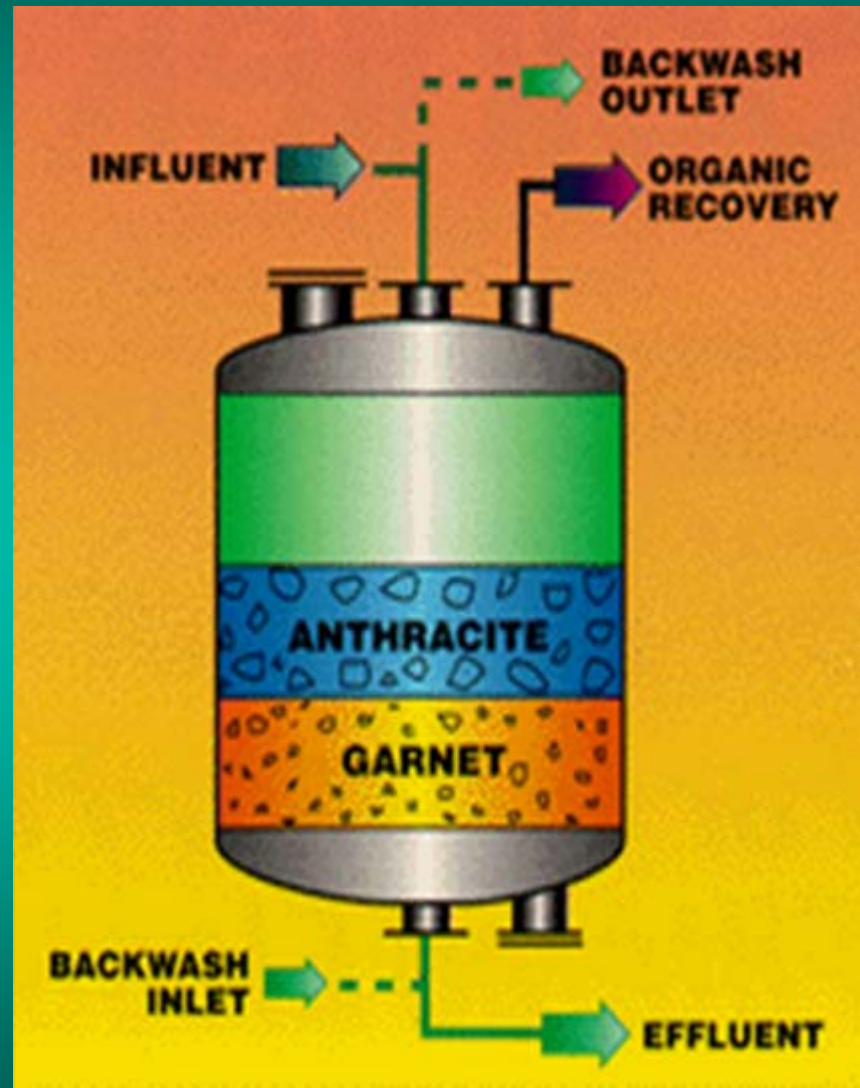
• Skorpion Zinc, Namibia	700 m ³ /hr
• Nkana Leach, Zambia	145 m ³ /hr
• Mufulira, Zambia	145 m ³ /hr
• Sable Zinc, Zambia	100 m ³ /hr
• Gunpowder, Australia	400 m ³ /hr
• Toquepala, Peru	825 m ³ /hr



Dual-Media Filters



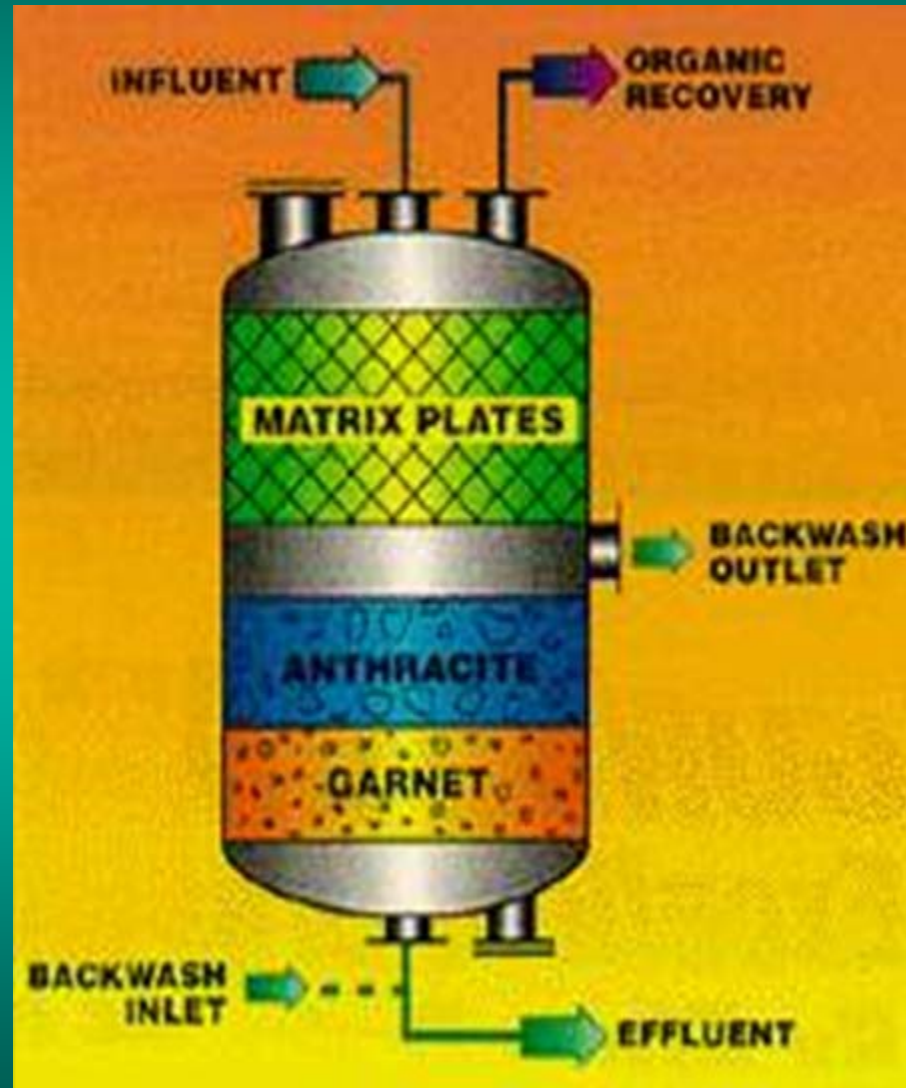
SX Dual-Media Filter



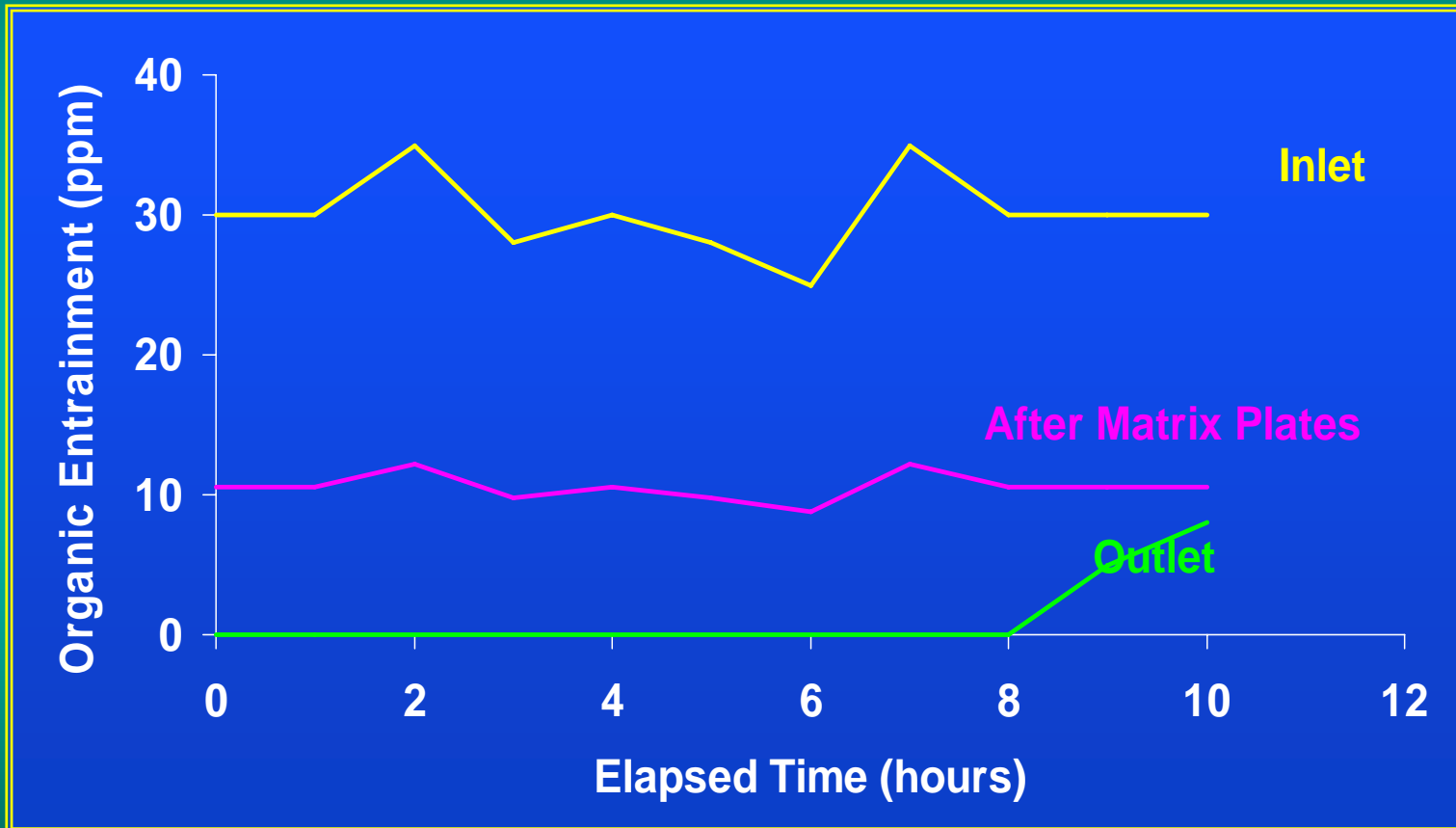
Gunpowder



CoMatrix Filter



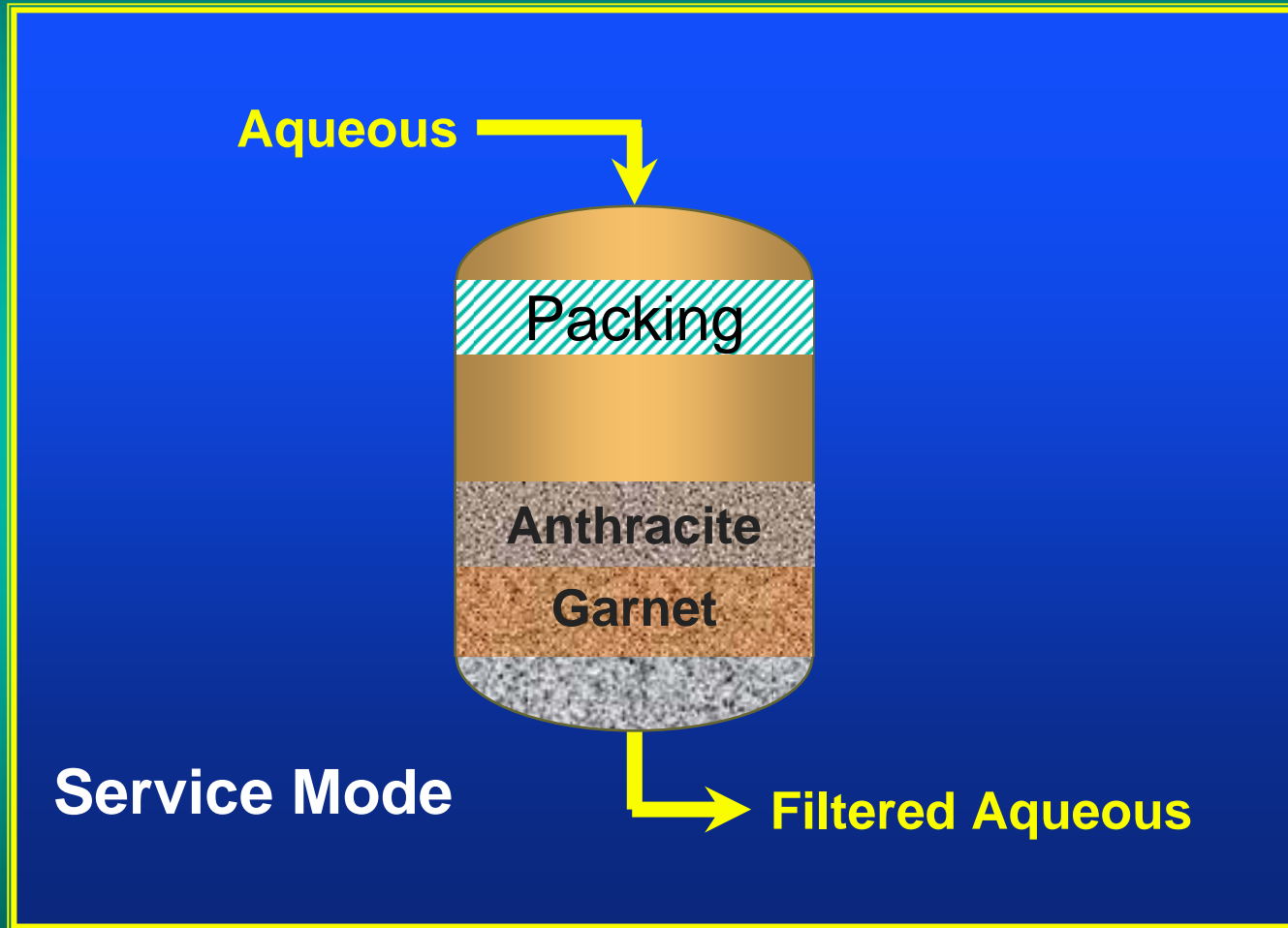
CoMatrix™ Electrolyte Filter Design Operation – 60m³/hr.m²



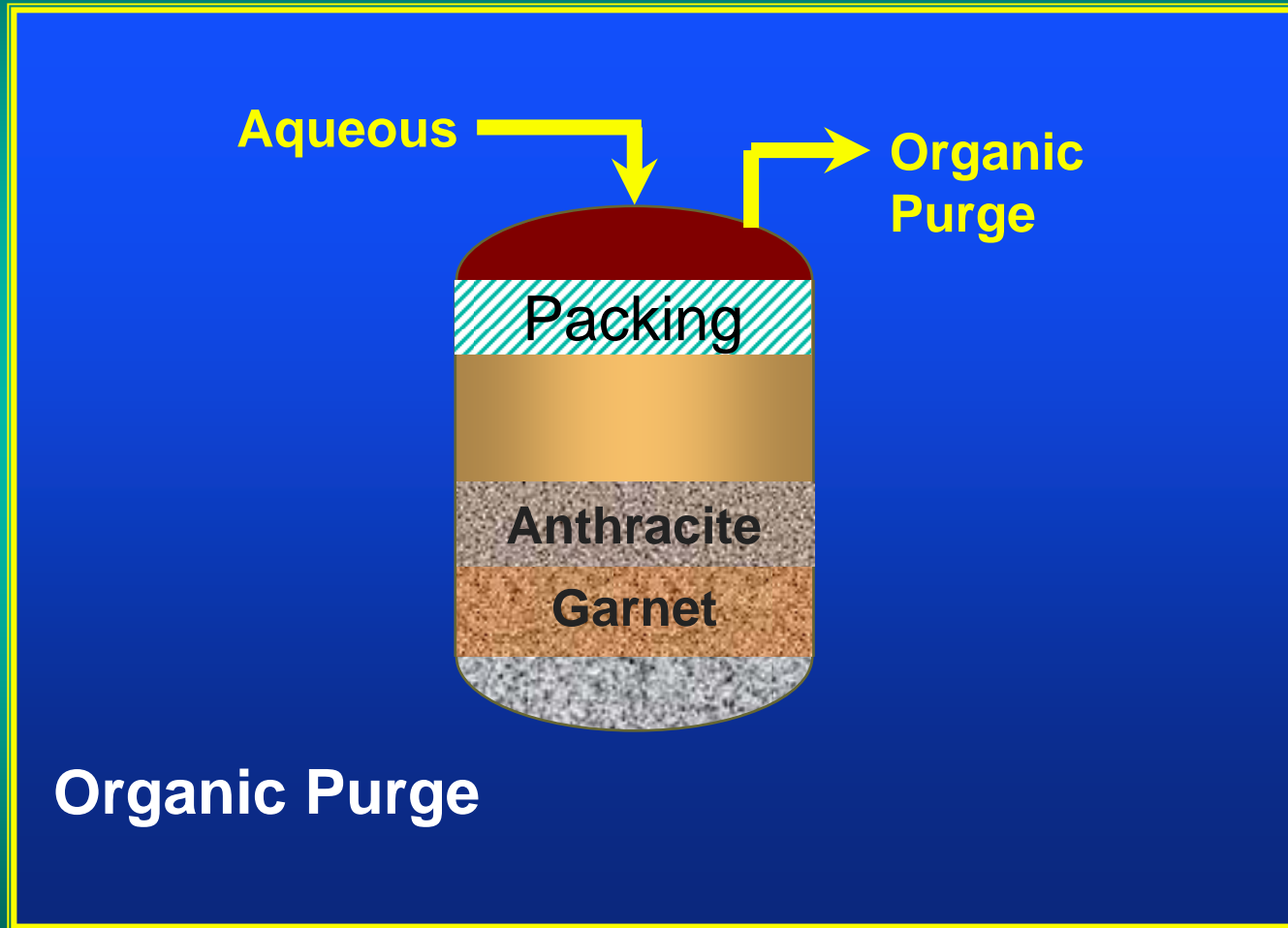
Operation



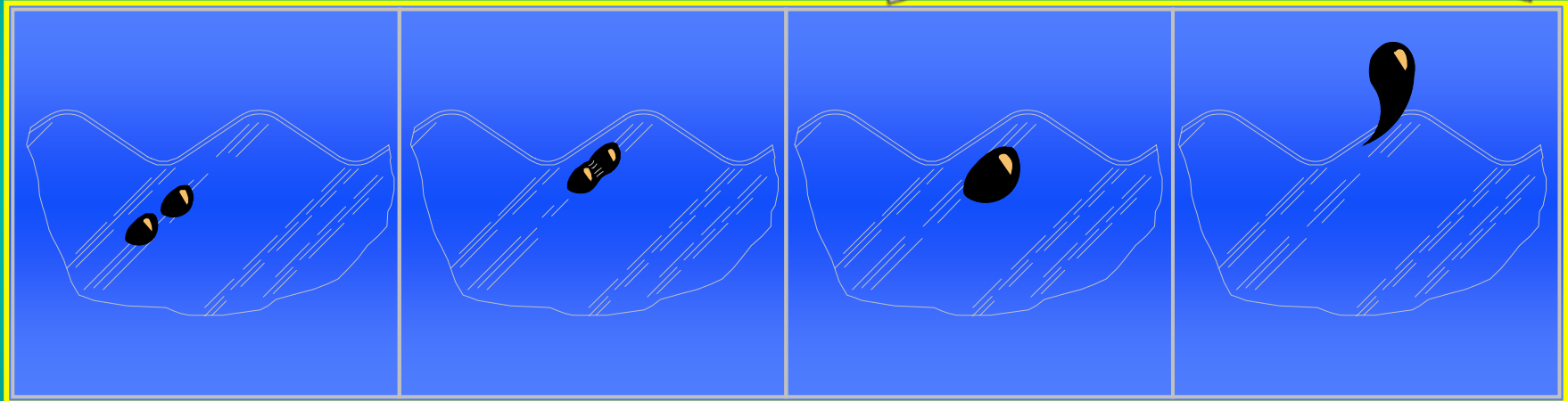
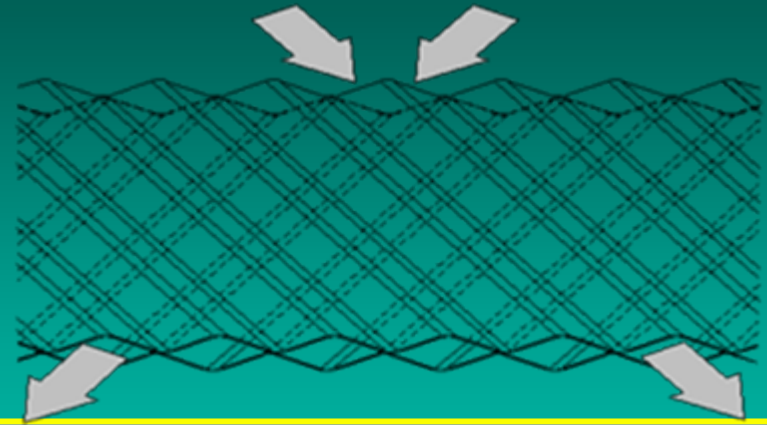
Filter Service Flow



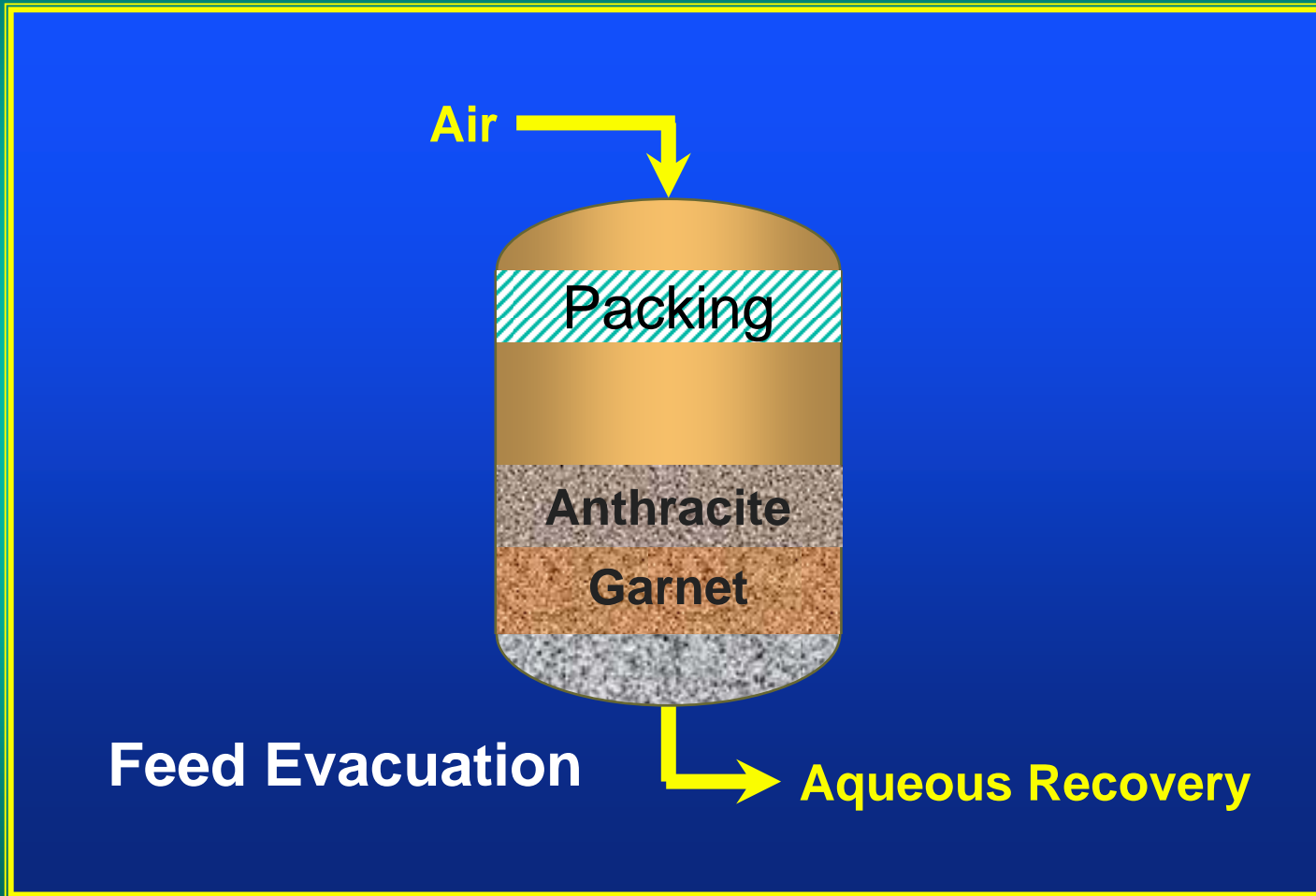
Filter Organic Purge



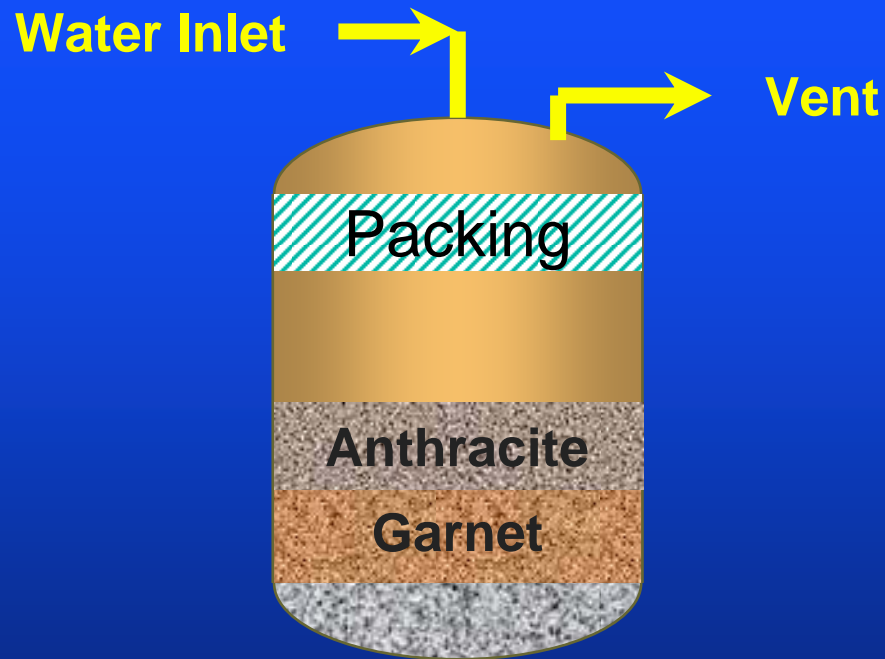
Coalescing Droplets on Matrix Plate Surface



Filter Feed Evacuation



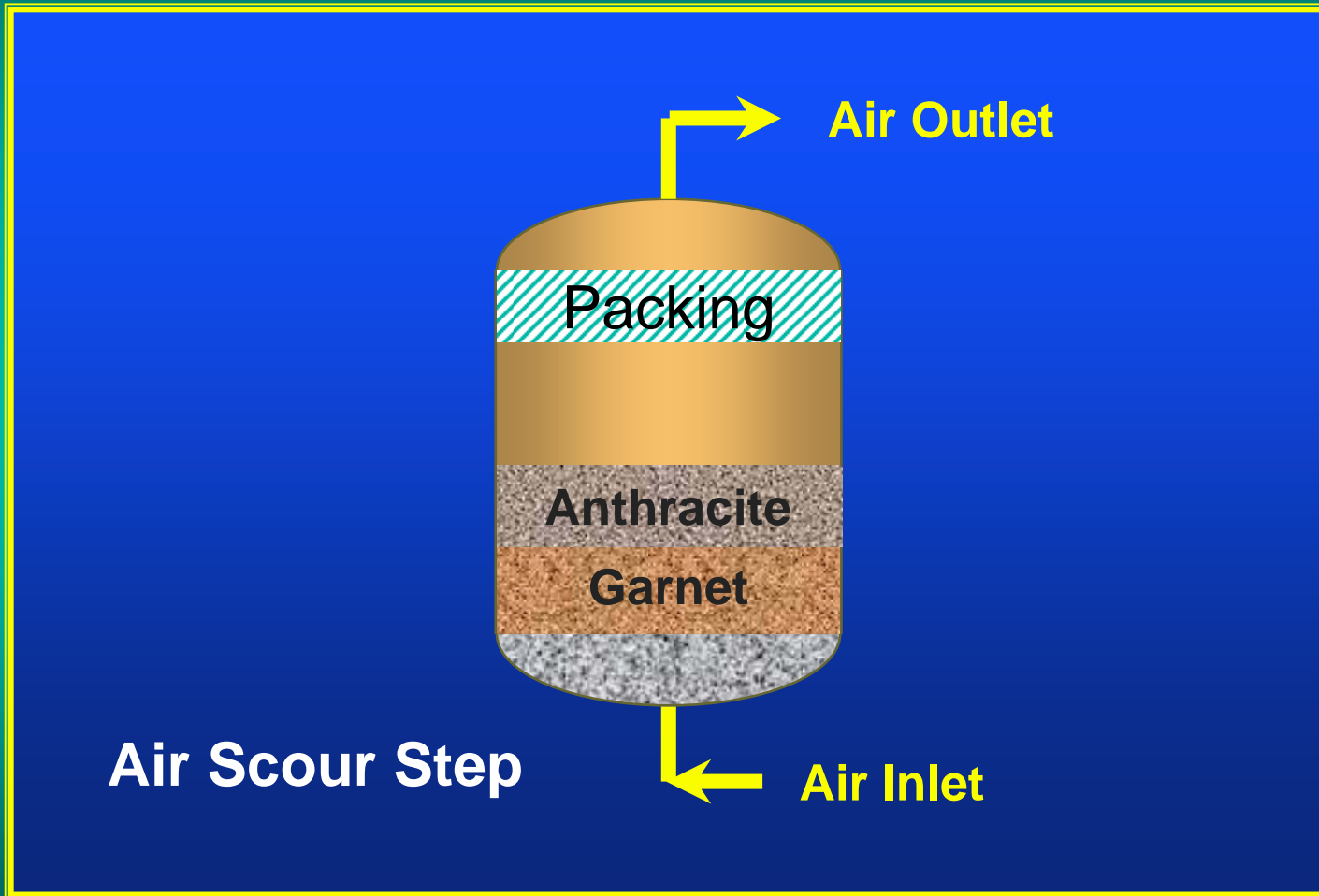
Filter Water Fill



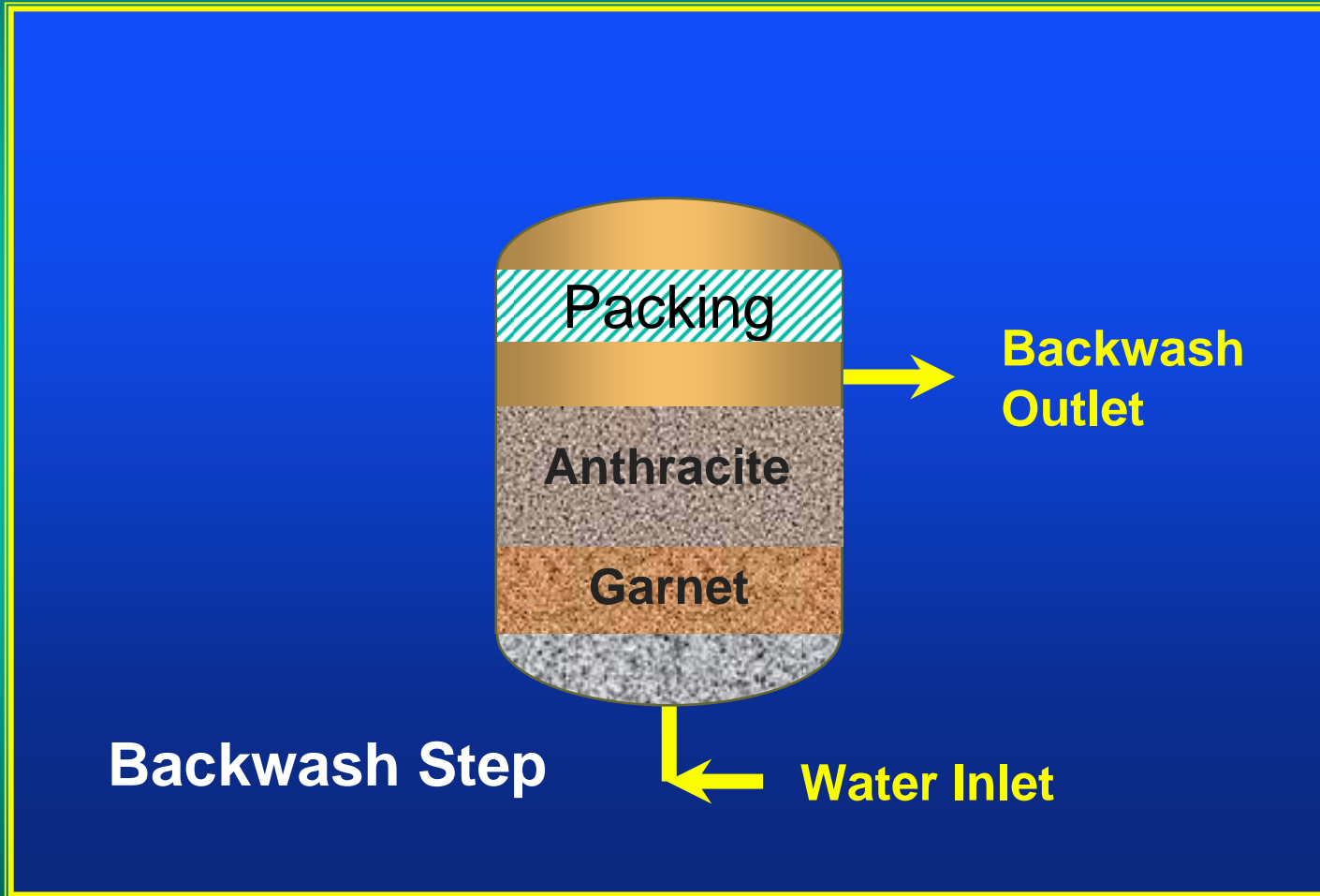
Water Fill Step



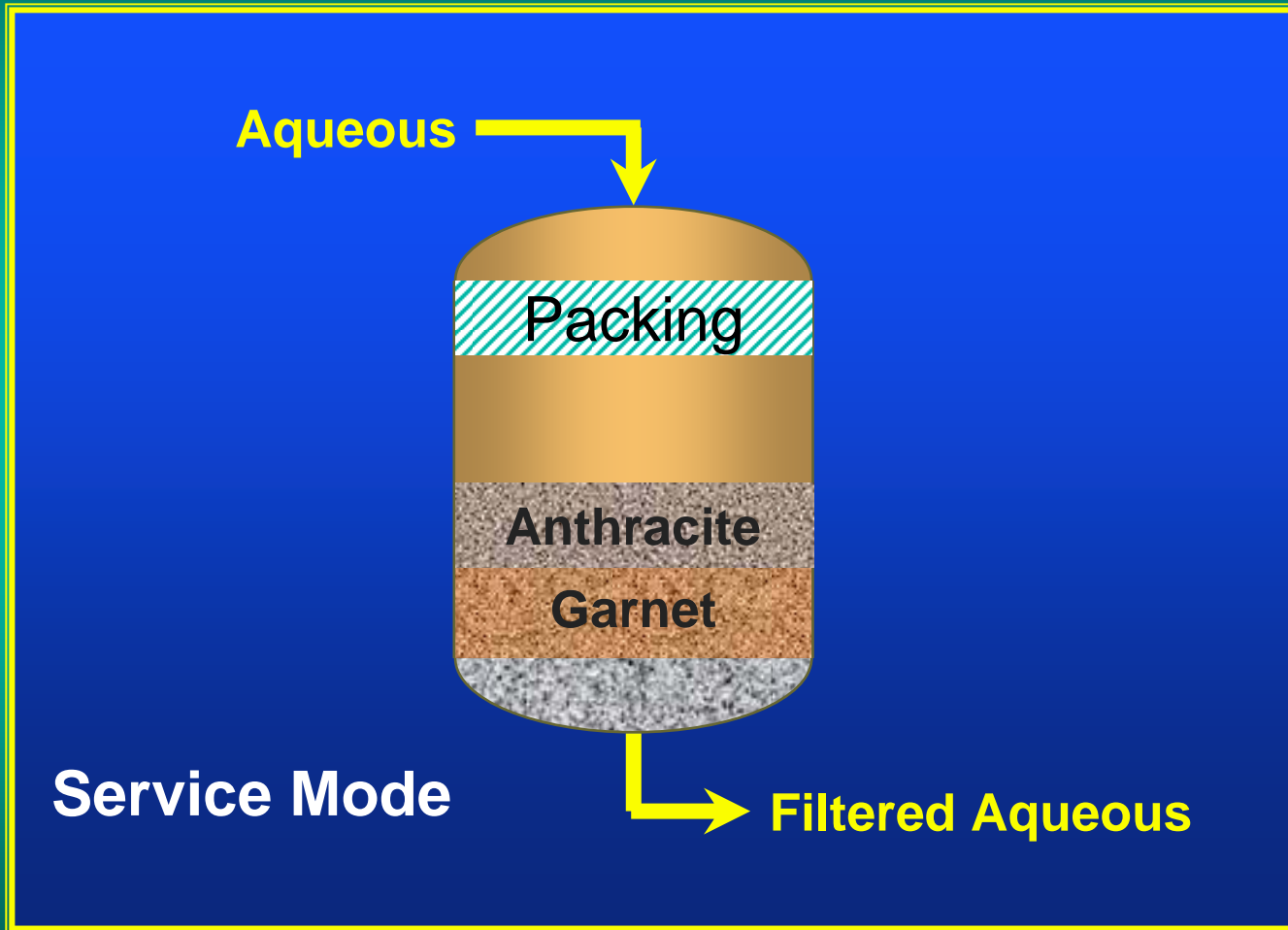
Filter Air Scour



Filter Backwash



Filter Service Flow



Technical Comments

- Process Design considers 12 hour cycle
- Mechanical Design considers the filters rated at 350 kPa.
- Operating Costs for CoMatrix will be lower, value depends on backwash
- Coalescing Plates not considered a consumable. Some extra cost added into Capital Spares (see op cost tables)



Organic Recovery

- To Recover - Entrained Organic solution from the electrolyte prior to Electro-winning
- Entrained Organic defined as droplets of organic solution not miscible in the aqueous portion
- Current technology considers the use of
 - Column Flotation
 - Coalescers
 - SX Dual Media Filters
- This presentation reviews the electrolyte filtration step in the organic recovery process.



Design Concept

- Anthracite bed holding capacity defined in kg organic per m² anthracite bed surface
- Anthracite load bearing capacity defines filter capacity
- Coalescing plates take out part of the organic load
- Less organic load on anthracite bed means
 - » Longer cycles without backwash
 - » Higher feed rates for the same cycle
 - » Higher organic content in feed



Feed Flow of 1800m³/hr

Dual Media – Design Base - 12 m³/hr. m²

- 150m² of Filter Area
- 10 x 4.6m (15') diameter DM Filters

CoMatrix – Design Base - 60 m³/hr. m²

- 30m² of Filter Area
- 3 x 3.6m (12') diameter Filters



CoMatrix Benefits

- Smaller Foot Print, less instruments, less valves, piping, controls etc.
- Lower Capital Cost
- Lower Operating Cost
 - » Less Filter Media
 - » Backwash Water Consumption 6lt per m³ Electrolyte
 - » Dual Media Backwash Consumption +/- 19lt per m³ Electrolyte
- Can accept higher Organic in Feed Stream – if lower design rates used



Industrial Scale Pilot Plant Trials

Objectives:

- Compare Operation of CoMatrix Design to standard Dual Media Design

Test Runs – Oxide Cu Leach Plant in Chile

- Dual Media ran at design Rate – 12 m³/hr.m²
- CoMatrix ran at:
 - ✓ 3 x DM Filtration Rate - 36 m³/hr.m²
 - ✓ 4 x DM Filtration Rate - 48 m³/hr.m²
 - ✓ 5 x DM Filtration Rate - 60 m³/hr.m²



Industrial Scale Pilot Plant Trials

Measurements

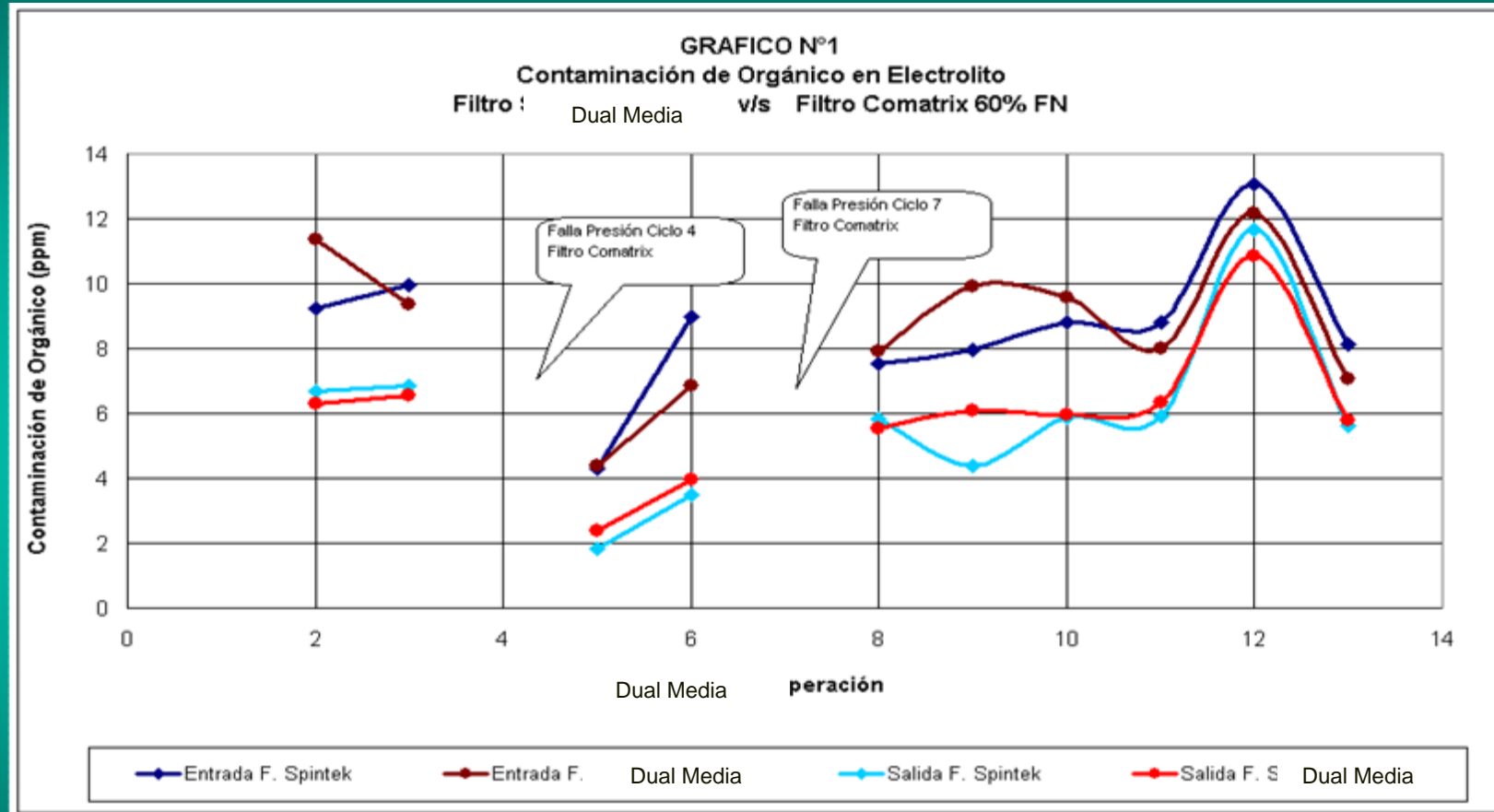
- Operating Time – in service
- Backwash Time – out of service
- Flow Rates
- Pressure drops during in and out of service operations

Pilot Equipment

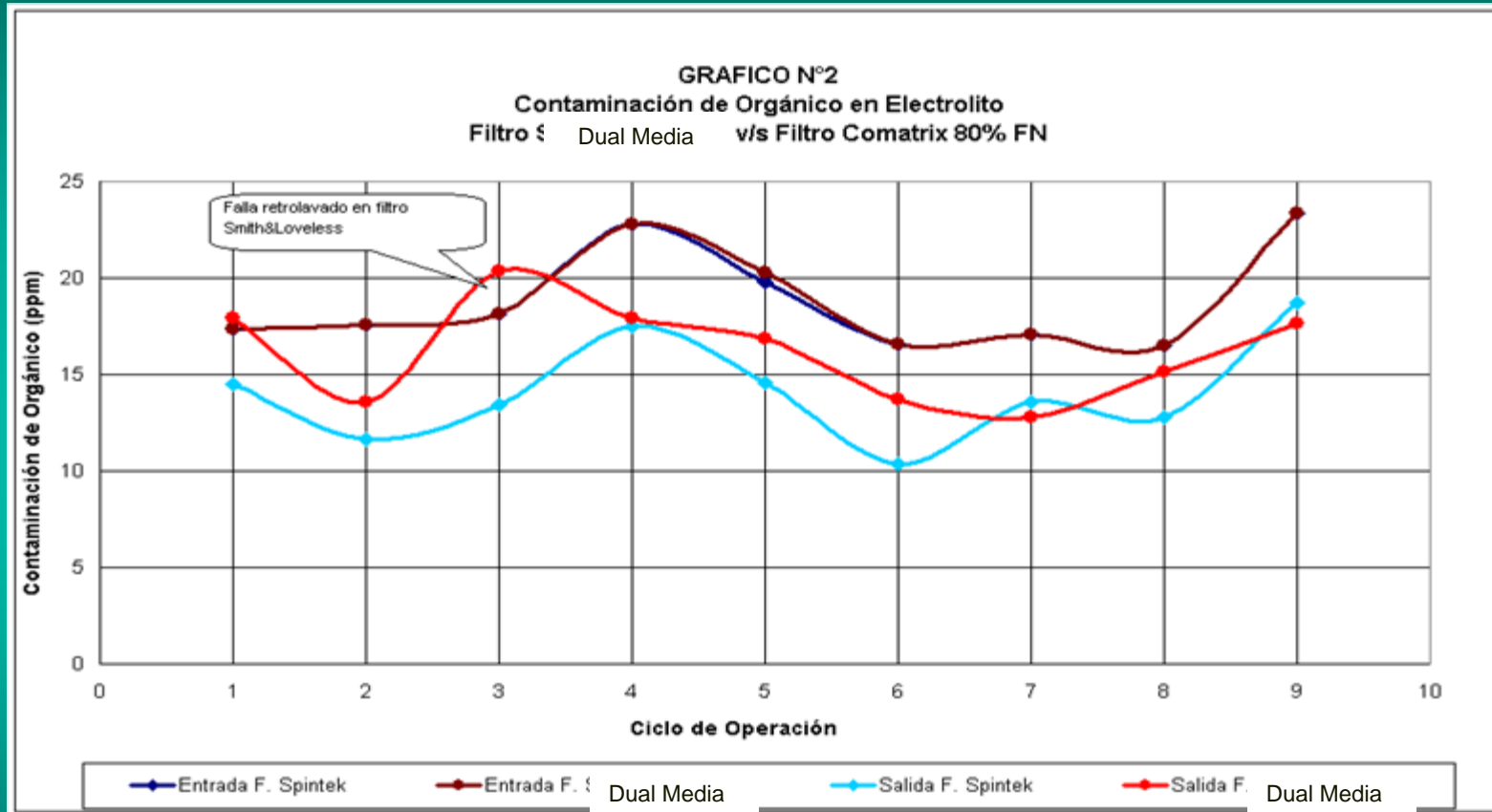
- 0.05m² CoMatrix Filter x 3mts high + filter media, CoMatrix packs, valves, PLC etc.



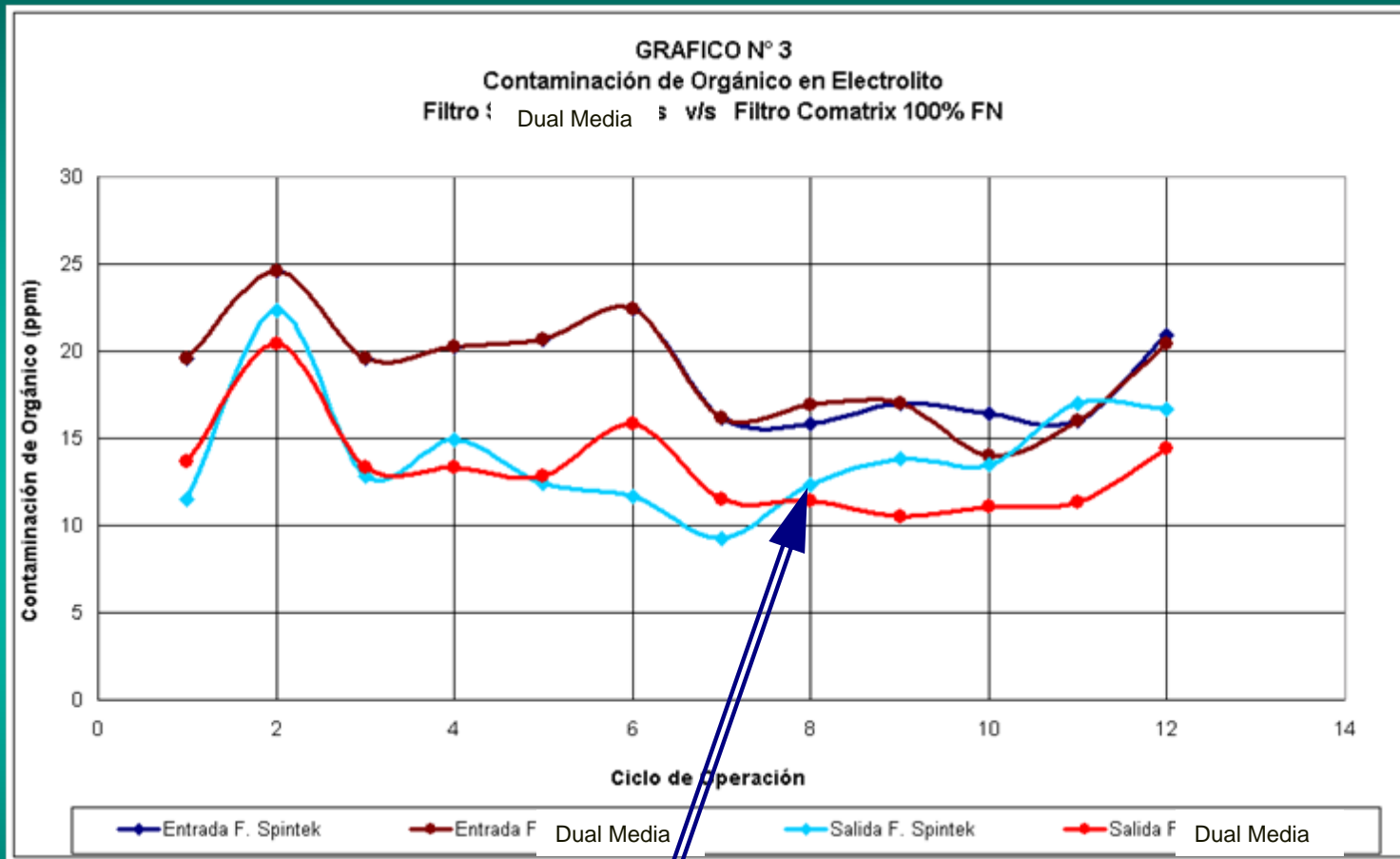
Results 3 x DM Filtration Rate



Results 4 x DM Filtration Rate



Results 5 x DM Filtration Rate



Organic Break Through after 8 hours



CoMatrix Installations

Anglo Base Metals - Skorpion



Raffinate & HCl Solution Filters



Loaded Electrolyte Filters

Escondida Low Grade Sulphide Project

- 4 x 4.11 m dia CoMatrix
- 480-625 m³/hr flow to each filter – 1880 m³/hr total
- Original project contemplated 8 x 4.72m Dual Media Filters
- 60 ppm inlet organic, 2 ppm outlet



Escondida Low Grade Sulphide Project

- Start up – June / July 2006
- Initial problems with services and automated sequence
- Initial Data sketchy. 2 to 3ppm organic and 1 to 3ppm inorganics at design flow @ 12 hour cycles



BHP Billiton Spence

- 6 x 3.81m dia CoMatrix
- 420-470 m³/hr flow to each filter – 2500 m³/hr total
- Original project contemplated 12 x 4.57m Dual Media Filters
- 100 ppm inlet organic, 2 ppm outlet



BHP Billiton Spence





GRACIAS – THANK YOU

